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## The Effects of Perceived Parental Expectations on Chinese Children's Mathematics Performance

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The influence of perceived parental expectations on children's school performance was examined. Sixty-four Chinese children from two elementary schools in Hong Kong participated. Subjects completed a questionnaire on their parents' expectations of their school performance. They later took an arithmetic test under the condition of anticipating either parental evaluation or peer evaluation of their test scores. When children anticipated that their parents would evaluate their performance, performance was better for those who perceived their parents as having higher expectations of them, and worse for those with lower perceived parental expectations. In contrast, performance in the peer evaluation condition was unrelated to perceived parental expectations.

Parental expectations are one of the many extracurricular factors that might influence children's academic performance (Bloom, 1976; Smith, 1969). Indeed, correlational studies have often found relationships between parental expectations and children's school performance (Chapman & Boersma, 1979; Hilliard & Roth, 1969; Hutner, 1972; Ziv, Rimon, & Doni, 1977). However, these findings do not demonstrate that parental expectations affect school performance because the parents may bring their achievement expectations into line with their children's actual school performance (Chapman & Boersma, 1979). Some researchers have sought to untangle the causal direction of this relationship. In one longitudinal study, Entwisle and Hayduk (1978) found that children's school performance became more consistent over time with their parents' prior expectations. Children who initially did worse than their parents expected tended to do

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better later; those who surpassed their parents' expectations at first tended to do worse later.

In another study, children's school performance was significantly correlated with parents' prior expectations, even after partialling out the children's IQ, gender, ethnicity, and children's own expectations (Entwisle & Baker, 1983). Brookover, LePere, Hamachek, Thomas, and Erickson (1965) raised parents' expectations experimentally through a series of conferences. Children whose parents' expectations were experimentally elevated improved significantly more than did their control counterparts in terms of grade point average. Considered together, these findings suggest that parents' achievement expectations for their children may influence subsequent performance.

How parental expectations may affect the child's performance, however, remains an open question. One possibility is that the child's perceptions of parents' expectations may mediate the effect of parental beliefs on performance. That is, parental expectations may have little effect unless they are communicated to the child. There is some suggestive evidence for this conjecture. Parsons, Adler, and Kaczala (1982) found that parents' expectations for their children's mathematics achievement were related to both the children's perceptions of the parents' expectations and to the children's self-perceptions. Brookover et al. (1965) found that children's perceptions of parents' expectations were related to both parents' expectations and children's subsequent performance.

Yet perceived parental expectations may be rather tangential. For instance, parental expectations may alter parental behavior, which in turn affects performance, regardless of the child's perceptions. It therefore seems critical to assess the child's perceptions of parents' expectations, and identify the conditions under which they affect school performance. Do the child's perceptions of parents' expectations influence performance in school? And if so, do they always influence the child's performance, or only when the child anticipates parental evaluation of the task in question?

In the present study, we examined the effects of children's perceived parental expectations on task performance in a classroom setting, where children anticipated evaluation by either a parent or a peer. We predicted that children's performance would be linearly related to their perceptions of their parents' expectations. We were particularly interested in the conditions under which these perceptions would have the greatest impact on performance. If children's perceptions of parental expectations per se affect performance, they should do so in both the parental evaluation and peer evaluation conditions. But if they affect performance via a self-fulfilling prophecy mecha-

nism, children's perceptions may affect their performance most when they expect their parents to be informed about their performance. In other words, when children expect their parents to learn about their performance, those who believe that their parents think highly of them may try harder in order to live up to their parents' expectations, and they may actually do better. By contrast, children who believe that their parents have low expectations for them may actually perform more poorly. They may have given up on impressing their parents, and may not bother to try. When peer evaluation is anticipated, however, these effects may not occur. We therefore predicted that the effect of perceived parental expectations on performance would be strongest in conditions of parental evaluation.

## METHOD

### *Subjects*

The participants were 32 boys and 32 girls in sixth grade in two Hong Kong elementary schools, their ages ranging from 10 to 15 years ( $M = 11.6$ ).

### *Procedure*

Children were first given a performance pretest and a questionnaire concerning their perceptions of their parents' expectations of their school performance. Subjects were then randomly assigned to either the experimental or the control condition. Subjects assigned to the experimental group received a *parental evaluation manipulation* on a second arithmetic test instructing them to inform their parents of their scores on that test. Subjects in the control group received a *peer evaluation manipulation* which mentioned nothing about the children's parents.

The experiment was conducted in Chinese, the subjects' native language. In a pretest session, subjects took a timed arithmetic test administered during mathematics class by their mathematics teacher. This test, constructed jointly by the first author and the teacher, included 30 problems of addition, subtraction, multiplication, and division. After the students completed the test, the teacher collected the test papers, and returned the corrected tests to the students on the following day. The teacher also told the subjects that they would be given similar 10-min tests every now and then to improve their arithmetic skills. Five min before the class ended, the subjects were asked to fill out a questionnaire concerning their parents' expectations of their school performance. The subjects answered four items on 5-

point scales: How do you think your parents would rate your school ability? Would your parents say that you have the ability to complete high school? Would they say that you could complete a college education? What kind of grades do you think your parents would say you are capable of getting?

This questionnaire was originally developed and validated by Brookover et al. (1965). In the present study, scores on the four items were linearly combined, yielding a mean of 12.61 ( $SD = 2.74$ ) out of a possible 20 points. The scale was also tested for reliability with another sample of sixth-graders from the same population ( $N = 21$ ), revealing high test-retest reliability over 1 week ( $r = .81$ ).

Subjects were blocked on pretest performance and perceived parental expectations, and assigned randomly within blocks to one of the two experimental conditions.<sup>1</sup> Three days later, the subjects were given another timed arithmetic test and were told that they would score it themselves. The test was accompanied by either the parental or peer evaluation manipulation. Subjects in the parental evaluation group read: "In order to let your parents know how you perform at school, please ask your father/mother to sign his/her name below, after this test has been corrected."

Subjects in the peer evaluation group read: "This test will be checked by your neighbor, i.e., the classmate sitting next to you. Please ask him/her to sign his/her name below, after this test has been corrected." Task performance was measured by scores on the second arithmetic test. This test was similar to the first, and contained 30 new problems of addition, subtraction, multiplication, and division. After the students completed the test, the teacher read the correct answers out loud, the students corrected their own tests, and the teacher collected them.

## RESULTS

Regression analyses were employed to test the effects of the independent variables on task performance, and to construct path models to represent the multiple determinants of performance. The regression model involved four variables and their interactions: evaluation condition, perceived parental expectations (PPE), pretest perfor-

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<sup>1</sup>For purposes of blocking, subjects were considered to be high ( $n = 28$ ,  $M = 27.2$ ) or low ( $n = 36$ ,  $M = 19.8$ ) on pretest performance (based on a median split), and low ( $n = 23$ ,  $M = 9.8$ ), medium ( $n = 24$ ,  $M = 12.8$ ) or high ( $n = 17$ ,  $M = 16.1$ ) in perceived parental expectations. However, both variables were used as continuous variables in the data analyses.

mance, and gender. Evaluation condition and gender were scored by using dummy coding (evaluation:  $-1$  for peer evaluation,  $+1$  for parental evaluation; gender:  $-1$  for male,  $+1$  for female). Pretest performance and PPE were measured continuously, with means subtracted from all variables. In Table 1 are the zero-order correlations among these variables.

Multiplicative interaction terms among the four variables were computed for each subject. Preliminary hierarchical model testing (Cohen & Cohen, 1975) indicated that the inclusion of two-way interaction terms accounted for significantly more variance in performance than the main effects model ( $p < .05$ ). However, inclusion of higher order interaction terms (i.e., three- and four-way interactions) did not account for significantly more variance. Thus, a total of 10 terms (4 main effects and 6 two-way interactions) was computed for each subject to be entered simultaneously in the regression analysis. Interaction terms that were not significant ( $p > .10$ ) were then trimmed from this model (Judd & Kenny, 1981), resulting in a final six-term regression model, summarized in Table 2.

In this model, the overall regression was highly significant,  $F(6, 57) = 9.38$ ,  $p < .001$  ( $R^2 = .50$ ), and several terms were individually significant. The main effect of pretest performance ( $p < .001$ ) indicated that children who performed better in the pretest had higher scores in the experimental session as well, and that the path from pretest performance to performance was significant (beta = .46). The main effect of PPE was nearly significant ( $p < .06$ ), and showed that children who perceived their parents to hold higher expectations for their school performance tended to do better on the mathematics test (beta = .20).

The interaction between PPE and parental versus peer evaluation condition was significant ( $p < .05$ ), indicating that the path from PPE to performance differed significantly in parental and peer evaluation conditions. Therefore, the path coefficient, or beta, from PPE to per-

**Table 1.** Intercorrelations of Independent and Dependent Variables

	PPE	Pretest Performance	Gender	Evaluation Condition
Perceived parental expectations (PPE)	—			
Pretest performance	.32*	—		
Gender	.09	.00	—	
Evaluation condition	-.10	.04	.09	—
Performance	.43**	.55**	.08	-.09

\* $p < .05$ . \*\* $p < .01$ .

**Table 2.** Regression Model for Performance

	<i>F</i> (1, 57)	<i>Beta</i>
Evaluation condition	1.16	-.10
Perceived parental expectations (PPE)	3.70	.20
Pretest performance	21.46***	.46
Gender	0.59	.07
Condition × PPE	4.32*	.21
Condition × Gender	9.91**	-.30

Test of overall model:  $F(6, 57) = 9.38^{***}$ ;  $R^2 = .50$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

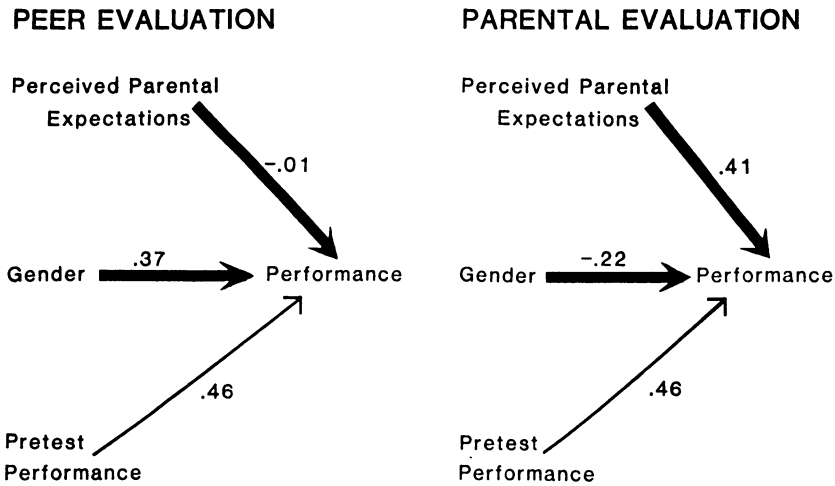
formance was estimated from the overall model separately for the two experimental groups (Judd & Kenny, 1981). It was  $-.01$  in the peer evaluation condition, and  $+.41$  in parental evaluation condition, showing that PPE was a significant predictor of children's performance only when they anticipated parental evaluation. This effect was also shown to be reliable by testing a regression model excluding this interaction term; the proportion of variance accounted for ( $R^2$ ) dropped from  $.50$  to  $.46$ , and this reduction was statistically significant ( $p < .05$ ).

The main effect of gender was not significant, but the interaction between evaluation condition and gender was significant ( $p < .01$ ). Again, this interaction is reliable whether we tested the regression coefficient or the change in  $R^2$  when this term was taken out of the model. The mean performance scores in the two conditions showed that girls ( $M = 26.1$ ) outperformed boys ( $M = 22.5$ ) in the peer evaluation condition ( $t(29) = 2.29$ ,  $p < .05$ ), whereas boys ( $M = 24.2$ ) did better than girls ( $M = 22.4$ ) in the parental evaluation condition, although the latter difference was not significant ( $t(31) = 1.03$ ). Girls' performance was significantly better when they expected peer evaluation than when they expected parental evaluation ( $t(30) = 2.26$ ,  $p < .05$ ).

Because the interaction between gender and condition was significant, the path coefficient from gender to performance was estimated from the overall model separately for the two conditions. It was  $+.37$  in the peer evaluation condition, indicating that girls had higher scores, and  $-.22$  in the parental evaluation condition, indicating that boys had higher scores in this condition.

The final path model is shown in Figure 1. Separate diagrams were drawn for performance in the peer and parental evaluation conditions because of the significant interactions with the evaluation con-

dition. Boldface lines indicate that the paths differ significantly between the two conditions. The paths from PPE and gender differ according to peer versus parental evaluation condition, and the path from pretest performance is the same in both models.



**Figure 1.** Path model for performance in parental and peer evaluation conditions, estimated from the overall regression summarized in Table 2. Boldface lines indicate those paths that differ significantly between conditions.

### DISCUSSION

The results of this study showed that children with higher perceived parental expectations tended to do better on an arithmetic test. However, further analyses revealed that there was no reliable relationship between perceived parental expectations and children’s performance when peer evaluation was anticipated. In contrast, there was a strong positive relationship between perceived expectations and performance when children believed that their parents would find out about their performance. These findings suggest that low perceived parental expectations might actually impoverish children’s performance when parental evaluation is anticipated. But perception of high expectations might enhance performance under similar circumstances. These findings are consistent with previous findings that parents’ expectations for their children may influence subsequent performance (Brookover et al., 1965; Entwisle & Baker, 1983; Entwisle & Hayduk, 1978).



The absence of a significant relationship between perceived parental expectations and children's performance in the peer evaluation group may be regarded as evidence that performance will be unaffected by perceptions of parental expectations when children do not think their parents will find out how well they did. Yet the strong relationship between such perceptions and performance in the parental evaluation group supports the hypothesis that perceived parental expectations, when called to children's attention, can have significant effects on the children's task performance. These results can be interpreted in the light of self-fulfilling prophecy. When children believe that their parents think highly of them and will be informed of their performance, they may try harder in order to live up to these expectations. As a result, high perceived parental expectations tend to enhance children's performance when the children anticipate parental evaluation. By contrast, when children think that their parents' expectations are low, they may not try very hard because they think that doing well on a single test cannot improve their parents' impression of their school performance. Alternatively, the anticipation of parental evaluation may distract them or engender debilitating performance anxiety.

In short, this study suggests that children's perceptions of their parents' expectations affect their subsequent performance. The link between these two variables, however, is not as straightforward as what might be expected from some previous findings. In previous research, children's perceptions of parents' expectations were found to be related to self-perceptions of ability (Parsons et al., 1982) and to subsequent performance (Brookover et al., 1965). In this study, the effects of the child's perceptions of parental expectations on performance varied according to differences in the evaluation context. Perceptions of parental expectations were most predictive when parental evaluation was anticipated. Under conditions of peer evaluation, however, they had no effect on school performance. Our results suggest that the mechanism by which parental expectations influence children's performance may depend on situational cues as well as more general effects on children's self-perceptions.

Another major finding in this study is the differential effects of parental versus peer evaluation on the boys' and girls' performance. Briefly, girls did especially well under conditions of peer evaluation, compared both to boys in the same condition and girls in the parental evaluation condition. This pattern is consistent with Dweck and Bush's (1976) findings that fifth-grade girls did better on a task when they were evaluated by a peer as opposed to an adult. Dweck and Bush also found the opposite pattern for boys; namely, boys did bet-

ter under conditions of parental evaluation as compared to peer evaluation. In this study, we found the same trend, although the effect of evaluation condition on boys' performance was not statistically significant. One explanation for these findings is that grade school girls are more concerned with adult evaluation than boys are, and the opposite holds true for peer evaluation (Bronfenbrenner, 1967, 1970, for cross-cultural evidence; Hollander & Marcia, 1970). Perhaps girls' concern about parental evaluation distracts them and thereby lowers their performance, and, similarly, boys' concern about peer evaluation may lower their performance.

It remains to be seen whether these findings will hold up across cultures and a broader age range (cf. Bronfenbrenner, 1970). As pointed out by an American delegation on early childhood development in China, "Although parental standards for good behavior were rather exacting [in China] they seldom require reinforcement, since children generally lived up to or even exceeded expectations" (Kessen, 1975, p. 40). Chinese children may care very much about their parents' evaluations, more so than children from other cultures. Cross-cultural replication of the present work may tell us more about how perceived expectations and school performance may be related in a larger context. Finally, given the negative consequences of low parental expectations, it seems important to identify in future research the determinants of parental expectations, and the processes by which children's perceptions of them influence academic performance.

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